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AU9468967

**(12) PATENT ABRIDGMENT (11) Document No. AU-B-68967/94**  
**(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 674968**

- (54) Title  
**VARIABLE WEIGHT PLAYBALL**
- (51)<sup>5</sup> International Patent Classification(s)  
**A63B 037/02**
- (21) Application No. : **68967/94** (22) Application Date : **08.08.94**
- (43) Publication Date : **22.02.96**
- (44) Publication Date of Accepted Application : **16.01.97**
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- (56) Prior Art Documents  
**US 4463951**  
**US 3450407**  
**US 390690**
- (57) Claim

1. A variable weight, squeezable playball whose heft is determined by the player, the ball comprising:

A. an outer casing formed of liquid-impervious, flexible material, the casing having a configuration that depends on the game for which the playball is intended;

B. a low-density compressible body confined within the casing and conforming thereto, said body being formed of sponge-like squeezable material capable of absorbing water introduced through an open port in said casing; and

C. a said port formed in the casing to provide access to the body encased therein and a removable stopper for said port whereby water may be introduced through the port when the stopper is removed therefrom and the playball is then squeezed by the player to expel air from the body, the water being absorbed by the body as the body resumes its normal configuration is distributed about the body to maintain the balance of the ball, after which the port is closed by the stopper to retain the water and the playball is then in condition for play.

## VARIABLE WEIGHT PLAYBALL

### BACKGROUND OF THE INVENTION

#### Field of Invention:

This invention relates generally to playballs, and more particularly to a variable-weight play ball having an encased sponge-like body within which water is dispersed to impart a desired degree of heft to the ball.

#### Status of Prior Art:

A standard football is of oval shape and is made of an inflatable, high strength inner bladder and an outer casing formed of heavy leather, rubber or flexible plastic material. The bladder is provided with a valve so that it can be inflated with air, the valve automatically closing to retain the air in the bladder. Made in a similar fashion are spherical soccer balls, volley balls and basketballs. In these standard balls, the bladder is molder to assume, when inflated, the same shape as the outer casing.

In the process of play, standard sports play balls of the pneumatic type are tossed, kicked and bounced, the balls being capable of withstanding very rough handling. While such balls are not regarded by adults as unduly heavy, they represent an intolerable load to a young child. Moreover, a standard inflatable athletic ball tends to produce a "hand sting." This effect arises when the ball which has a hard casing is caught by the bare hands while moving at high velocity.

While small children are attracted to conventional athletic balls and enjoy watching adults play soccer, football and other ball games, in the hands of a small child these athletic balls are heavy and dangerous, especially in indoor play. The standard inflated athletic ball has a relatively large diameter and a smooth, hard

outer casing which makes it very difficult for a small child to grasp, throw and catch.

The toy and game industry has long recognized the need for lighter, softer and potentially less dangerous balls for young children. Thus, balls in various shapes and sizes are now commercially available which are molded of polyurethane foam material and other light-weight compressible plastics. Thus, the patent to Martin, 4,772,020, discloses a football intended for children in the form of a one-piece molded elliptical body constituted by soft, light-weight elastomeric foam material, such as polyurethane foam. And the patent to Ma, 4,919,422, discloses a spherical ball of baseball size formed of flexible foam plastic material.

While such foam plastic balls are safe in the hands of pre-school children and will inflict no harm even if the ball is hurled toward the body of another child, they fail in many respects to satisfy the typical child's desire for a ball that looks like a real athletic ball of the type used by adults, and can be kicked, thrown or bounced like a regulation ball.

Moreover, light-weight balls made of flexible foam plastic material, though much softer in the hands of children than the regulation balls they imitate, are incapable of withstanding rough handling. Thus a foam plastic spherical ball having a diameter equivalent to that of a regulation soccer ball, though it can be thrown and bounced, cannot long survive being vigorously kicked by players.

In my prior patent, 4,834,382, I disclosed a pneumatic playball that has a configuration and appearance of a standard pneumatic athletic ball such as a football or basketball, yet it is much lighter, and therefore when in the hands of young children, it is far safer to play with. And despite its light weight, the ball is exceptionally strong and can withstand rough handling.

This pneumatic playball includes an outer casing of non-stretchable fabric material having a closable opening therein, the configuration of the casing depending on the nature of the ball. The casing encases an ordinary  
 5 balloon of stretchable material which when unconfined is capable of being inflated to assume a generally globular form, the balloon having an air-passage stem. In its uninflated state, the balloon is inserted into the casing through the opening, the stem then projecting out of the  
 10 opening.

After the confined balloon is inflated by blowing air through its stem to cause the balloon to conform to the inner surface of the casing and to assume the same configuration, the stem is knotted to seal the balloon.  
 15 The knotted stem is pushed under the opening which is then closed, whereby no portion of the encased balloon can be extruded from the casing when the ball bounces.

As pointed out in my prior patent 4,035,426, a fabric-encased balloon, while not nearly as heavy as a  
 20 leather encased conventional pneumatic ball, has sufficient weight to permit easy throwing without, however, inflicting injury should the ball hit a child. However, in some circumstances, the ball may be too light to permit play. Thus on a windy beach, wind gusts will  
 25 often deflect the fabric-encased balloon and interfere with play activity. In order, therefore, to give greater weight to the ball, this patent suggests that this can be done by wetting the outer fabric casing.

Wetting the fabric will add some weight to the ball,  
 30 but since the fabric of the outer casing is exposed, it will not remain wet for long because of evaporation from this surface. Moreover, as it is only the outer surface of the ball that is water laden, the amount of weight added to the ball may not be sufficient for certain types  
 35 of play activity.

Where the ball is of basketball size or greater and is to be tossed about in the fashion of a medicine ball, it is then desirable that the ball have considerable heft. Or where the ball is of soccer ball size and is to be played with by older children, it is desirable that its weight be closer to that of a regulation soccer ball, so that when kicked it will behave like a regulation ball. These ends cannot be achieved with my prior pneumatic encased balloon ball, which is inherently light in weight.

#### SUMMARY OF THE INVENTION

In view of the foregoing, the main object of this invention is to provide a compressible play ball having any desired ball configuration, the body of the ball being formed of low-density, flexible foam plastic open-cell material and being confined within a casing of non-stretchable material to create a ball of exceptional strength capable of withstanding rough handling.

A significant advantage of a ball in accordance with the invention is that a large percentage of its low-density, foam-plastic body is constituted by air; hence the ball in its initial state is not much heavier than an encased balloon playball of my prior type. However, by adding water to the body which is absorbed thereby, the heft of the playball may be increased to a desired degree.

More particularly, an object of this invention is to provide a playball of the above type whose outer casing is liquid-impervious and includes a small closable port, and whose foam plastic body has sponge-like characteristics whereby water can be introduced into the body through its open port and absorbed thereby to impart heft to the body, the water being thereafter extrudable through the port to reduce the water content of the body and thereby lighten the ball.

Yet another object of this invention is to provide a playball of the above type whose appearance is that of the

head of a fanciful humanoid or animal-like character, so that one is able to throw or otherwise play with this head.

Also an object of this invention is to provide a durable, high-strength ball of the above type which may be manufactured at low cost.

Briefly stated, these objects are attained in a variable-weight playball whose outer casing is formed of liquid-impervious, non-stretchable, flexible material, such as a resin-coated fabric, the casing being provided with a closable port. Confined within the casing is a compressible body having the same configuration which depends on whether the ball is of the spherical type or in some other shape. The body is formed of low-density, open-cell, flexible foam plastic material having sponge-like properties. To impart heft to the ball, water is introduced through the port into the body and absorbed thereby, the port then being closed to retain the water. To thereafter lighten the ball, the port is opened and the ball is squeezed to discharge water through the port until the ball has the desired reduced weight, after which the port is closed. the weight selected depends on the use to which the ball is put.

In a preferred embodiment the ball has the appearance of a fanciful humanoid or animal-like character so that one is able to throw or otherwise play with this head.

#### BRIEF DESCRIPTION OF DRAWINGS

For a better understanding of the invention as well as other objects and further features thereof, reference is made to the following detailed description to be read in conjunction with the accompanying drawings, wherein:

Fig. 1 is a perspective view of one preferred embodiment of a playball in accordance with the invention, the outer casing being partially cut away to expose the inner foam-plastic body of the ball;

Fig. 2 is a section taken in the plane indicated by line 2-2 in Fig. 1;

Fig. 3 shows a second embodiment of the playball; and

Fig. 4 schematically illustrates a ball in accordance with a third embodiment of the invention in which the ball has the appearance of the head of a fanciful character.

### DESCRIPTION OF INVENTION

#### First Embodiment:

Referring now to Fig. 1, there is illustrated a variable-weight playball in accordance with the invention, the ball being spherical and having a diameter corresponding to that of a regulation basketball or soccer ball. In practice the ball may have a larger or smaller diameter. The ball is constituted by an outer casing 10 having a spherical shape within which is confined a compressible body 11 whose shape conforms to that of the casing so that no space exists there-between.

Casing 10 is created by interfitting pieces 10A, 10B, 10C, 10D, etc., of non-stretchable fabric sheeting sewn together by filamentary thread lines which are not visible on the other surface of the casing. If the fabric is made of thermoplastic synthetic fibers, the pieces may be ultrasonically seamed together to render them watertight at the seams. A preferred fabric for this purpose is parachute cloth, which is a high-strength, light-weight, closely woven fabric made of nylon fibers. Other types of non-stretchable fabrics, such as Gore-tex, may be used for the casing material.

Sealed to fabric piece 10B of casing 10 or to any other piece thereof, is a flexible disc 13 formed of thermoplastic material, such as polypropylene, provided at its center with a small port 14 that is internally-threaded. As shown in Fig. 2, threadably received in port 14 is a removable plug 15 to provide access to body 11 of the ball. Plug 15 is provided with a diametrical slot so

that it can be turned in or out by a small coin or a screwdriver.

While a small port is necessary to the playball, the closure therefore need not be in the form of a screw-in plug, for in practice use may be made of a press-in plug or other closure means.

Laminated or otherwise applied to the inner surface of casing 10 to render it waterproof is a film 12 of liquid-impervious material. Film 12 may be created by a resinous coating applied in a molten state to the fabric of the casing, the coating impregnating the fibers of the fabric to both reinforce the fabric and render it impervious to water. Or when the casing fabric is thermoplastic in nature, a PVC or other thermoplastic film may be laminated to the fabric material by heat and pressure. One could produce a casing of non-stretchable, flexible, waterproof material using a high-strength plastic film for this purpose. But the advantage of a fabric casing is that its outer surface is not smooth and the ball is therefore more easily gripped by a child.

Body 11 is formed of low-density, open-cell flexible foam plastic material which is highly compressible and has sponge-like characteristics.

Foam plastics range in density from one tenth of a pound to 65 pounds per cubic foot, and range in consistency from rigid materials suitable for structural applications, to flexible substances for soft cushions. And they range in cellular formation from open or interconnecting cells to the closed or unicell type. A preferred form of plastic material for body 11 is one in which gas is generated chemically during the reactions that take place in forming the open-cell plastic, such as polyurethane foam. In producing this foam, a polyester resin and an aromatic diisocyanate react to form a prepolymer which then reacts with water to form a urethane polymer. Because of the carbon dioxide generated in this



reaction, its presence causes the urethane resin to assume an interconnected open-cell foam.

Foam plastic body 11 is of a low density, preferably not exceeding one and one half pounds per cubic foot.

5 Hence the ball, in its initial state, is relatively light in weight, for a large percentage of the body is constituted by the air which fills the cells.

10 In manufacturing this ball, the casing may be used as a mold for the foam plastic body which is created by pressure feeding the foam plastic in its molten state into the interior of the casing through open port 14 until the entire interior is filled with the molten mass.

When the mass is coated and cured, the resultant body which conforms to the shape of the casing is constituted by flexible, open-cell foam plastic material. At the interface of the outer surface of the molten mass and the interior surface of the casing a pore-free plastic skin is formed which fuses to the fabric casing to waterproof the casing and thereby obviate the need for a waterproofing film. However, this film is useful, for it also functions to reinforce the fabric casing.

In order to impart a desired degree of heft to the ball, water is added to its sponge-like body to be absorbed thereby, the water being distributed throughout the body, so that it is properly balanced. To this end, plug 15 is removed to open port 14, and the ball is compressed by hand to expel air out of the sponge-like body, the air being discharged through the open port. Water is then fed through the port into the body, and as this is done, the hand pressure on the ball is gradually released to create a negative pressure within the sponge-like body. This acts to soak up the water and to distribute it uniformly throughout the body. One adds as much water as is necessary to bring up the weight of the ball to the desired level, at which point the port is closed to retain the water within the ball.

Should a player later wish to somewhat lighten the playball, this is easily accomplished by again opening the port and squeezing the ball to extrude water from the sponge-like body out of the port until the ball attains the desired reduced weight.

When the playball is vigorously kicked or bounced, the shock is absorbed by the compressible body of the ball, but the shape of the ball is maintained by the non-stretchable fabric casing which permits indentation of the ball in the region at which the force is applied, but does not permit the ball to assume any shape other than its predetermined spherical configuration.

#### Second Embodiment:

The invention is by no means limited to balls having a spherical shape. As shown in Fig. 3, the ball may be in a football format, in which case it is constituted by a non-stretchable fabric casing 16 which is waterproof and is made in the same manner as casing 10 in Fig. 1, and an open-cell, flexible, foam-plastic body 17 confined within the casing, both the casing and body having an oval football configuration. Sealed to casing 16 is a flexible disc 18 provided with a closable port, as in Fig. 1, to permit the water to be added to or extracted from body 17.

While there have been shown and described preferred embodiments of a variable-weight playball in accordance with the invention, it will be appreciated that many changes and modifications may be made therein without, however, departing from the essential spirit thereof. It is not essential that the casing be non-stretchable, as long as it confines the foam-plastic body encased therein. Thus the casing may be made of a somewhat stretchable neoprene or plastic material.

A preferred way of making the variable weight playball is to make use of a fabric outer casing of the type disclosed in my prior balloon ball patents, and

inserting through the port of this casing a conventional inflatable beach ball having a liquid-impervious flexible plastic skin of PVC or similar synthetic-plastic film material, the beach ball having a closable air inlet.

5           The beach ball is inserted into the casing through the port thereof in its collapsed state with its air inlet aligned with the port of the fabric casing. The configuration and dimensions of the beach ball match those of the casing within which it is confined. However, instead of inflating the beach ball with air, injected into the air inlet of the beach ball through the port of the casing is molten foam plastic material of the open-cell type, the molten plastic filling the beach ball so that its plastic skin is caused to conform to the inner surface of the fabric casing. When the molten plastic cools and cures, this creates the foam plastic body of the playball which can then be impregnated with water in the manner disclosed previously to an extent imparting the desired heft to the playball. The closure on the air inlet is used to retain this water within the body.

10           In this arrangement, the foam-plastic body of the playball is confined within a waterproof plastic skin which conforms to the inner surface of the fabric casing. The combination of the beach ball skin and fabric casing creates a liquid-impervious outer casing to prevent leakage of water from the playball.

### Third Embodiment:

15           In the first and second embodiments the playball has a conventional appearance, the geometry of the ball depending on the game for which it is intended. In the playball illustrated in Fig. 4, the ball which is generally spherical has an appearance which simulates the head of a fanciful humanoid or animal-like character, such as a comic-strip TV or movie character well-known to children.

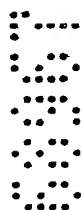
Fig. 4 shows only the outer, flexible, spherical casing 19 of the ball which envelops a sponge-like open cell foam core body. To simulate the head of the character, printed on the outer surface of the casing is a pair of eyebrows 20 and 21 which are adjacent the upper pole of the sphere, below which is printed a pair of sunglasses 22 and 23, the nose of the character being implied by the bridge of the sunglasses. Also printed on the ball casing is a large open mouth 24 from which is projected a tongue 25.

Integrated with mouth 24 is the casing port which provides access to the foam body, the port being closed by a removable round stopper 26 which in practice may have the same color as the mouth so that it appears to be a part of the mouth.

The graphics of the character shown in Fig. 4 are illustrative of one manner in which a fanciful character head may be created so that in playing with the ball, one is effectively throwing, bouncing or otherwise manipulating the head of a character, thereby giving meaning to the expression that "heads will roll."

In practice, the outer surface of the casing 19 which may be fabricated on a water impermeable, moldable thermoplastic material such as polyvinyl chloride, may be molded to create a bas-relief to provide a better gripping surface for the ball.

In imparting heft to the ball water is added thereto in the manner previously described in connection with Figs. 1 to 3. However, since the water is introduced by removing the stopper 26 and then injecting the water through the mouth 24 of the character, this creates the impression that the character is being given a drink of water.



**The claims defining the invention are as follows:**

1. A variable weight, squeezable playball whose heft is determined by the player, the ball comprising:

5 A. an outer casing formed of liquid-impervious, flexible material, the casing having a configuration that depends on the game for which the playball is intended;

10 B. a low-density compressible body confined within the casing and conforming thereto, said body being formed of sponge-like squeezable material capable of absorbing water introduced through an open port in said casing; and

15 C. a said port formed in the casing to provide access to the body encased therein and a removable stopper for said port whereby water may be introduced through the port when the stopper is removed therefrom and the playball is then squeezed by the player to expel air from the body, the water being absorbed by the body as the body resumes its normal configuration is distributed about the body to maintain the balance of the ball, after which the port is closed by the stopper to retain the water and the playball is then in condition for play.

2. A playball as set forth in claim 1, in which said body is formed of open-cell, flexible-foam, synthetic plastic material.

20 3. A playball as set forth in claim 1, wherein said configuration has a spherical form.

4. A playball as set forth in claim 3, in which the spherical casing has an outer surface which is formed to simulate the head of a fanciful humanoid or animal-like character having eyes and a mouth, said port in the casing and the stopper therefor being integrated with the mouth.

25 5. A playball as set forth in claim 4, in which the head of the character is printed on the outer surface of the casing.

6. A playball as set forth in claim 5, in which the character head is created by a bas-relief molded on the outer surface of the casing.

30 7. A playball as set forth in claim 1, wherein said configuration has an elliptical form.

8. A playball as set forth in claim 1, wherein said casing is formed of fabric material whose inner surface is resin-coated to render the fabric waterproof.

35 9. A playball as set forth in claim 1, wherein said casing is formed of a fabric material created by thermoplastic fibers to whose inner surface is laminated a film of thermoplastic film to render the fabric waterproof.

10. A playball as set forth in claim 2, wherein said foam material is polyurethane.

11. A playball as set forth in claim 1, wherein said port is formed in a disc sealed to said casing, and the stopper therefor is a plug received in said port.

5 12. A playball as substantially described herein with reference to Figures 1 and 2.

13. A playball as substantially described herein with reference to Figures 2 and 3.

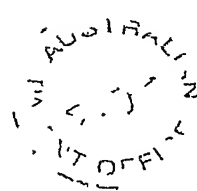
10 14. A playball as substantially described herein with reference to Figure 4.

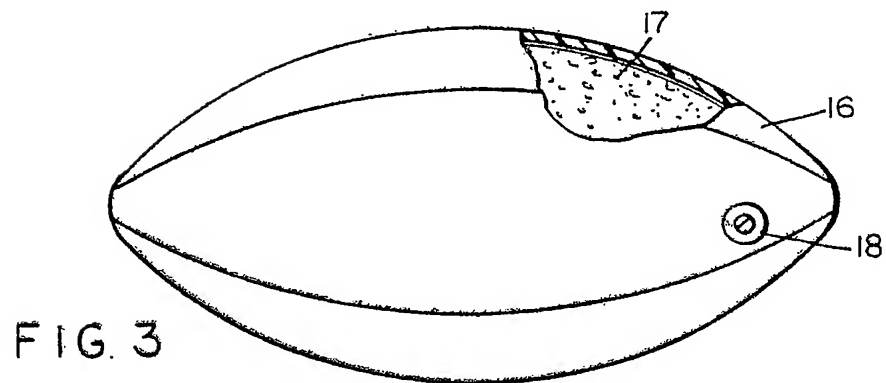
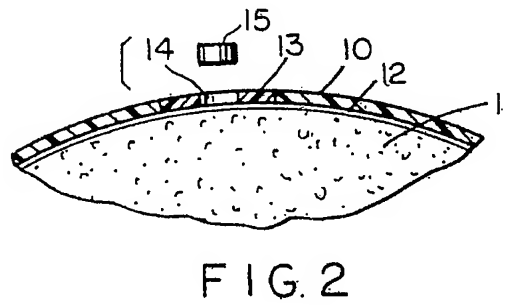
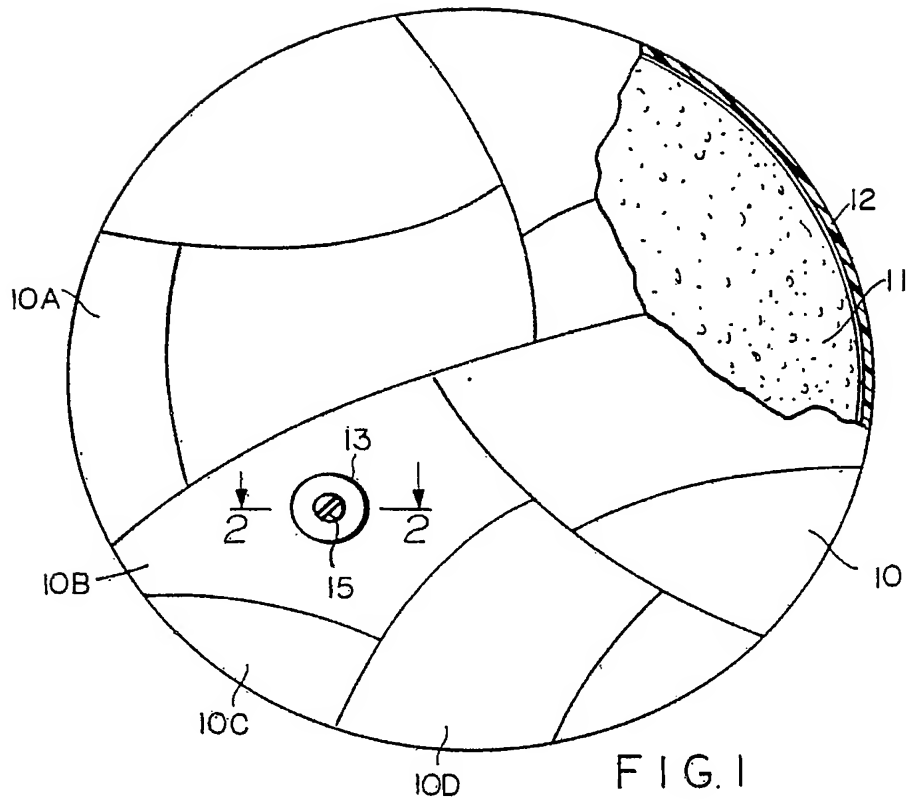
DATED this Twentieth Day of February 1996

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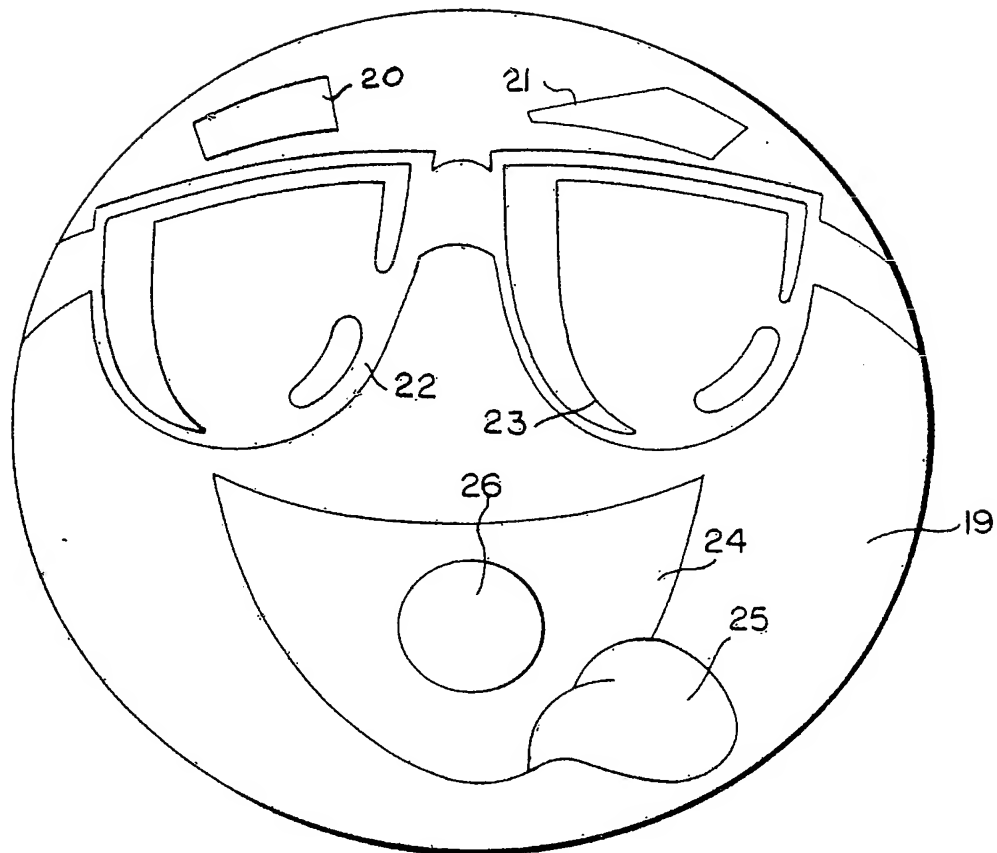


FIG. 4

BNS  
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